Embedding Webcasts in Virtual Worlds to Enhance User Experiences

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1. Introduction

This spring, the Exploratorium—a museum of science, art, and human perception in San Francisco—created a science education program around its live Webcast coverage of the total solar eclipse of March 29, 2006. Created in collaboration with NASA's Sun-Earth Connection Forum, telescopic views of the rare Sun-Moon-Earth alignment were broadcast with scientific commentary via satellite, television, and Internet streaming to hundreds of thousands of viewers worldwide.

Engaging Webcasts of live informal science education events can stimulate online audiences to delve more deeply into program content. Interested viewers may read articles, do research, engage in game play, or view graphics and simulations they might not otherwise have discovered.

2. Creating an Embedded Webcast

To create a shared Internet environment in which to experience the solar eclipse, the Exploratorium collaborated with community members in Second Life, a popular virtual world which allows participants to chat with each other and create and share content. The eclipse's path of totality crossed directly over a second-century Roman amphitheater in Side, Turkey. The Exploratorium's video and educator field crew broadcast the event from this ancient amphitheater.

To simulate this unique setting, the Exploratorium built a 3D replica of the amphitheater in Second Life and equipped it with a "viewing screen" for watching the live video stream of the event, providing community members with a shared environment and in-world context. Participant avatars gathered in three locations in the virtual world to experience the eclipse. Each location included a complete copy of the amphitheater and an adjacent planetarium building containing several interactive models illustrating solar eclipse alignments and moon shadow paths. The three locations were set up for redundancy and to scale the Second Life audience size to a projected 225 maximum across three discrete locales or "sims."

The live video, downlinked by satellite at the Exploratorium, was encoded in QuickTime™ MPEG4 format at 320x240 resolution using QuickTime Broadcaster. The encoded video was streamed using QuickTime Streaming Server directly to individual client connections for each Second Life participant. The Second Life browser rendered the video texture on the viewing screen object surface in the amphitheater.

Each participant viewed the program simultaneously and was able to move around the theater and change their viewpoint. Participants chatted with each other about what they were viewing, adding a new social dimension to viewing Webcasts. The shared experience reflected the excitement of the people experiencing the event live in Turkey.

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A key aspect of virtual worlds such as Second Life is the sense of presence participants feel in the space. Low network latency, advanced rendering and physics engines, and identity and environment customization are integral to creating the immersive experience.

Figure 1: Second Life community members watching the Exploratorium live Total Solar Eclipse 2006 Webcast.

During the eclipse, this feeling seemed dramatically enhanced by the ability of virtual world participants to experience the eclipse phenomena together via the live presentation. Participants asked questions of each other about what they were seeing and commented on the sensation of feeling like they were actually experiencing the eclipse first-hand. During the program, one of the scientists in Turkey thanked the Second Life collaborators and participants, making a further connection between the remote event and virtual participants.

3. Conclusion

Sixty-five Second Life community members came to see the live eclipse Webcast. Most participants arrived 30 minutes before the main presentation started, and then stayed to view the entire one-hour program. The program began at 2 a.m. Pacific time, and it's believed that the middle-of-the-night start time limited the North American audience in the virtual world. Though the Second Life audience size was small in comparison to the audience watching the live video stream offered via Web links, the length of time of their experience is significant. Throughout the day and for the following several weeks, many participants returned to watch the on-demand replay of the video in the amphitheater and to explore the planetarium and eclipse exhibits. Community members responded positively and expressed their interest in returning for similar live events on science topics.

Following this experiment, educators and media developers at the Exploratorium are planning to create new science exhibits in Second Life and continue research on the impact of integrated live Webcast events in virtual world communities.